

## MuCell in sight: At the Fakuma trade show, KraussMaffei exhibits a foamed component with partial IML decoration

- Reduced CO<sub>2</sub> footprint through material and energy savings
- Optimized HPS-Physical Foaming (HPS-PF) MuCell screw with up to 30 percent more plasticizing capacity
- First use of APCplus with MuCell
- Partner network for molds, film, film cleaning with extractor and online testing with a view of the interior of a component

**(Parsdorf, 2023-09-18). MuCell can do everything that's currently in demand—generate savings on material, energy and investment costs—and thus noticeably reduce the CO<sub>2</sub> footprint of products. If these lightweight items are used in the automotive industry, this will also reduce fuel consumption later on. At the Fakuma trade show (Friedrichshafen, October 17–21, booth A7-7303), KraussMaffei and its partners demonstrate on an all-electric PX 321-1400 that the above is also viable for intricate visible parts, which have not yet been the focus of the multifaceted technology. The new universal screw plays an important part in this.**

For MuCell, KraussMaffei has created the new HPS-Physical Foaming screw with a longer three-zone area, which can be universally used for all plastics (with and without fiber reinforcement) and has a plasticizing capacity that has increased by up to 30 percent. This allows for the selection of lesser screw diameters than before, which significantly reduces investment and operating costs for the plasticizing unit, or for the generation of a greater output using a screw of the same size as before.

Due to the development work, KraussMaffei commands wide-ranging expertise with regard to all MuCell screw designs currently on the market and has been able to test variants of the front and center check valves and

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single-flight and double-flight three-zone areas using a modular system. The APCplus machine function has also evolved and is now being used with a gas-charged melt for the first time. APCplus shifts the changeover point and the holding pressure profile from shot to shot based on the measured melt viscosity, which results in extremely weight-constant components.

## **Reliable partner network**

The trade show application, a storage table for trucks and commercial vehicles, features a few more technical highlights demonstrating that physical foaming is of interest even in areas that may have seemed off the radar until now. An entire team of highly skilled project partners worked toward this goal. The story begins with the surface decoration by in-mold labeling, for which Isosport (Eisenstadt, Austria) supplied a suitable film preventing the formation of bubbles by the outgassing nitrogen.

For the mold, Wirth Werkzeugbau (Helmbrechts, Germany) put all its skill to use—for instance for the opening stroke, which lets users achieve the maximum possible degrees of foaming. Usually, immersion edges are required for this process, but Wirth managed without them thanks to its expertise. For molds for MuCell, precise cooling is particularly important to prevent what is known as the post-blow effect. This effect makes bubbles emerge on the surfaces after the process—while the melt in the interior of the component is still hot—and renders the part unusable. In the trade show application, special mold cooling channels ensure uniform cooling at the surface—without variothermal technology—and safely prevent hot spots.

## **Immaculate exposed faces without streaks**

In addition to the cooling, the graining by Reichle (Bisingen/Teck, Germany) makes a crucial contribution to achieving perfect exposed faces on the foamed components. Another prerequisite for the streak-free surface aesthetics is a suitable material. Partner Lyondellbasel has a wealth of experience with polyolefins in the visible area of foamed components and already supplies them to OEMs.

In addition to the cooling in the mold, an efficient machine-side temperature control system is necessary. The system Orca is provided by Jurke Engineering. Orca measures the speed and quantity of the flow by ultrasonic

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means—from the outside and without contact with the medium. The precise temperature control optimizes the cycle time.

As usual, Trexel is a reliable partner with whom KraussMaffei has been successfully collaborating since 2001. The metering system originates from this partner. It is fully integrated into the KM MC6 control system and consequently ensures very easy, intuitive handling. If necessary, even satellite solutions are offered that allow multiple machines, all fully integrated, to be supplied with the necessary gas using only one compressor.

### **Sophisticated automation**

An LRX 150 linear robot from KraussMaffei picks up the blank film from a drawer in which four different film types can be kept close at hand. Then the robot puts down the selected film on the cleaning station, where all particles and/or contaminants are removed using a cleaning brush from Wandres (Stegen, Germany) and the matching extractor system from ESTA (Senden, Germany), two more of our partners. The robot gripper executes a turn concurrently with the cleaning process so that clean suction devices pick up the cleaned film again.

Then the "stack gripper" inserts the film into the mold, and the finished part is demolded. Demolding is followed by the handshake transfer to a second robot for a foam structure test of the component by means of a testing system from Teratronics (Orsay, France). The testing system specifically allows users to visualize the compact outer layers and the spatial distribution of the MuCell foam in the interior of the component and to assess the production as free of bubbles. After this test has been completed, the component is placed on a conveyor belt and transported out of the automated system.

### **All data at a glance**

The easyTrace 2.0 systems collect all data related to the injection process and the structural test shot by shot and displays it on a screen. In addition, a QR code appears under which all process parameters for this individualized component have been stored. Here, easyTrace 2.0 acts as an interface

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system that gathers all data of all process nodes and functions as an interpreter for existing customer-side MES or ERP systems.

MuCell provides a wide variety of options to reduce the CO<sub>2</sub> footprint through material and energy savings. The trade show application demonstrates that it succeeds in doing so even in the production of challenging visible parts.

01\_KM\_IMM\_2023\_09\_Fakuma PX 321 Mucell\_total view.jpg

Live @Fakuma: The PX 321-1400 MuCell with new universal screw with up to 30 percent more plasticizing capacity

02\_KM\_IMM\_2023\_09\_Fakuma PX 321 MuCell\_detail mold.jpg

A look inside the mold: The LRX 150 linear robot removes the finished part

03\_KM\_IMM\_2023\_09\_Fakuma PX 321 Mucell\_APCplus.jpg

Every part a good part: With the machine function APC plus

04\_KM\_IMM\_2023\_09\_Fakuma PX 321\_sample.jpg

Immaculate surfaces in a great variety: At Fakuma, the PX 321-1400 produces a storage table for trucks in four different designs

Photos: KraussMaffei

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## **KraussMaffei – Pioneering Plastics**

KraussMaffei is among the world's leading manufacturers of machinery and systems for the production and processing of plastics and rubber. Our brand stands for cutting-edge technologies – for more than 185 years. Our range of services covers all areas of injection molding machinery, extrusion technology and reaction process machinery. In 2022 we added additive manufacturing to our portfolio. This broad range of technologies gives KraussMaffei a unique selling point in the industry. With the high innovative power of our standardized and individual product, process, digital and service solutions, we can guarantee customers sustained additional value over the entire value-adding chain. Our range of products and services allow us to serve customers in many sectors including the automotive, packaging, medical and construction industries, as well as manufacturers of electrical and electronic products and household appliances. KraussMaffei employs around 4.700 people all over the world. With more than 30 subsidiaries and over 10 production plants, as well as about 570 commercial and service partners, we are represented internationally close to our customers. The company was founded in 1838 in Munich.

In April 2016, China National Chemical Corporation Ltd. (“ChemChina”) became the majority shareholder of KraussMaffei Group. In December 2018, ChemChina listed the KraussMaffei Group as KraussMaffei Company Limited in Shanghai. The listing opened up access to the Chinese capital market and local investors. Now ChemChina is part of Sinochem Holdings Corporation Ltd., one of the world's leading chemical conglomerates with over 220,000 employees.

For more information: [www.kraussmaffei.com](http://www.kraussmaffei.com)

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